

MODERN SURGERY

ITS

PROGRESS AND TENDENCIES

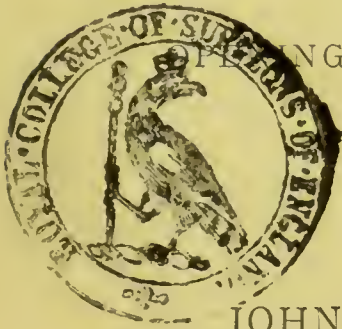
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BY

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PRESENTED

BY THE

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GENTLEMEN,—In no department of science has the intellectual activity of the present age wrought a greater change in a comparatively short space of time than in that of medicine.

In a period that is within the ready memory of many, which to me seems but as yesterday, though it is separated from us by a span of years equal to the lifetime of a generation, the changes that have taken place in medicine in almost all that concerns its pathology, and in much that relates to its practice, have been so continuously great and their progress at times so rapid—indeed, so sudden and so unexpected—as to amount almost to a revolution.

For truly it has been by no slow and progressive movement, but by sudden leaps and great bounds, that medicine has been carried forward in its onward march since that time when the microscope first became an instrument of daily necessity in the elucidation of its pathology, and anæsthetics of hourly employment in its practice.

The study of the causes that have influenced in so signal and undoubtedly in so favourable a manner the onward progress of the science and art of medicine is full of interest—not as a subject of barren antiquarian research, but as one having an important and vital bearing on the

future of our profession. And it is as interesting as it is useful to point out the circumstances that appear to have more directly and immediately led to the great changes that we see around us—to endeavour to gain from them an insight into the direction towards which modern medicine is tending, and to trace out those lines of thought and of action that may most profitably be followed in the immediate future with the best prospect of yielding the speediest and the richest harvest of practical results. But to do this with the whole of the great subject of Medicine would not only occupy more time than I have at my disposal, but would lead me into paths with which I am but imperfectly acquainted; and I will therefore restrict myself to the consideration of these questions as they affect that department in the study and practice of which my life has been spent, and in the teaching of which I have been engaged in this College and in that Hospital for nearly a quarter of a century.

There are essentially and distinctly two great schools of Surgery in this country—the *practical* and the *scientific*. But although I may broadly divide modern surgery into these two schools, I do not for one moment wish it to be supposed that I consider them as being absolutely separated by a hard and fast line. What I mean is that there is a tendency in the mind of every surgeon to gravitate more or less distinctly in one direction or another,—towards the practice of the art or the study of the science of surgery.

We will examine briefly the more distinctive characteristics of each of these schools, trace their more recent advances, and endeavour to penetrate into their immediate future.

And first let us take the practical school. Rendered resplendent as it has been by the names of the Heys and of the Clines, of the Coopers and Aston Key, of Liston, Crampton, and Syme, it is that which is and ever has been the most popular in this country, for it is most in accordance with the practical genius of the British people, with their inborn and instinctive aptitude for mechanical pursuits and manipulative action, as it is also certainly that which is most in unison with the primary objects of a practical calling such as that of the surgeon.

In tracing the progress of surgery as a practical art, and determining the causes that have led to the great development of its mechanical and manipulative departments, I must carry you back with me for a short period in its history, and ask you to devote a few minutes to the contemplation of what operative surgery was but one generation back, how it has since progressed, and then to consider not only the main causes that have led to that progress towards perfection, but to direct our attention to the course which it is at present tending to take.

One generation back—say thirty-five years ago—the anatomical school of surgery had reached its acmé of development, if not of perfection. Popular prejudice had been arrayed against the study of anatomy, but it had been prosecuted with zeal by a chosen few. Those practical anatomists necessarily became the operating surgeons of the day. By them surgical anatomy was assiduously studied, and those operations which had for the basis of their successful performance a thorough knowledge of the relations and structure of different parts of the human frame, such as the ligature of the larger arteries, the

operation for strangulated hernia, and that of lithotomy, were often and doubtless skilfully practised. If we add to these the frequent performance of amputations, rendered necessary by the very imperfect knowledge that surgeons then possessed of the pathology of diseases of the joints and bones, the removal of some tumours, chiefly of the breast, and the performance of a few of the many minor operations which have now so greatly multiplied in frequency, we shall have a *résumé* of all that took place and that might be witnessed in the operating theatre of those days.

If one of those great men whose names we justly venerate as those of the giants of a past generation of surgeons; if the Clines or the Coopers—aye, even the Listons and the Aston Keys—were to revisit, not “the pale glimpses of the moon,” but the scene of their former triumphs, and were to appear again in that bright light of professional observation and in the broad glare of that not altogether unfriendly criticism that is shed on the central figure in the operating theatre of one of our metropolitan hospitals, he would find that in many cases he would have to learn his work afresh, and that he would be more fitted to take his seat on the benches amongst the pupils than his stand in the area amongst the teachers of his art. But not only would this be the case during the operations themselves—it would be equally so when he witnessed the treatment of the wound: the arteries closed by torsion, acupressure, or carbolised catgut ligatures, metallic wire for sutures, antiseptic muslin, guards and protectors for dressings, and skin-grafting for the promotion of cicatrisation.

By some of the distinguished surgeons of the period of

which I am speaking, operations were doubtless admirably and skilfully performed; but it is equally certain that by a large proportion of surgeons they were done timidly, slowly, and often in a slovenly manner, without definite or precise rule.

In fact, thirty-five years ago surgery had fallen in its manipulative art into a sluggish and almost stagnant state. In the two greatest operations in surgery—those for stone and for aneurism—there had been no advance in one since Cheselden, nearly a century before, had so successfully operated; or in the other since John Hunter, more than half a century previously, had linked his name inseparably with the operation for aneurism.

But this stagnation could not long endure, and the breath that gave new life to surgery, and that infused fresh vigour into its art, came from the north.

Whilst surgery slumbered in the south, it had for some years been endowed with an extreme degree of activity in the north, and it was rapidly becoming revolutionised and perfected in its art by the skill, the energy, and the teaching of a band of distinguished men—nearly cotemporaneous—who gave lustre to the great school of surgery which at that time flourished in the northern metropolis. To Lizars and to Liston, to Syme, and to the youngest, but not the least brilliant, of that bright constellation of northern stars, to William Fergusson, British surgery is undoubtedly indebted for much that is its peculiar glory and chief characteristic in its operative department; and it was at this period and from that school that modern British surgery drew its deepest inspiration, and received its first great and decided impulse in all that relates to its

art and manipulative department. The great characteristics of this school of surgery were boldness in the conception, and rapidity, precision, and simplicity in the performance of operations. By the boldness of their conceptions, these surgeons were led to contemplate and successfully to execute operations that had never or but rarely been attempted in this country.

The rapidity with which these operations were conducted, was, in those pre-anæsthetic days, as much valued by the patient as it was admired by the surgical spectator.

But the great merit of this school, and that quality which has exercised the most marked and enduring influence on operative surgery in this country, was the introduction of the most perfect simplicity, combined with the most accurate precision in the method of operating. These surgeons used few and uncomplicated instruments, and they taught that the knife might be wielded in surgery in a practised hand with the same skill and the same certainty that the master of a craft exercises in the handling of any instrument that is employed in his calling.

In all these respects, Robert Liston, the then foremost member of that band of distinguished surgeons, was excelled by none. His influence was soon felt after his arrival in London, and his example is often unconsciously imitated in many an operating theatre at the present day. I would willingly, if time permitted me, pay a tribute of respect to his transcendent surgical genius, to which full justice has never yet been rendered. Cut off in the fulness of his matured experience and of his professional activity by a death as sudden as it was premature, Liston died too early for the full accomplishment of his fame, but not too soon for the fruition of his example.

Cotemporaneous almost with Liston's death, though preceding it by a few months, occurred that other great event which more than any other has tended to raise modern surgery in its manipulative department to the highest point of excellence. For the introduction of anæsthesia had a two-fold effect. It not only induced patients more readily and more frequently to submit to operations, but it also allowed the surgeon to practise many operations which the fortitude of a patient would otherwise hardly have enabled him to endure. It tended to popularise operative surgery in the profession, and by inducing many men to become operating surgeons who would otherwise have shrunk from the daily infliction of suffering as a necessary part of their calling, it greatly extended the number of operations as well as the habit and the practice of operating, and thus made that the business of the many which had previously been the function of the few.

During the ten years which immediately preceded the introduction of anæsthesia, surgery partook of that great advance which characterised all the natural and physical sciences. In those days of mechanics' institutes and of societies for the promotion and diffusion of useful knowledge, surgery as mechanical as it is useful did not lag behind in the race, and the zeal with which surgery had been studied led to the establishment of various distinct departments within the precincts of the art itself, in each of which the treatment of numerous surgical affections by operative means was diligently and extensively carried out. That operation which had been devised by the genius and perfected by the skill of Stromeyer, became the foundation on which the great department of orthopædic surgery was reared. Ophthalmic surgery became an art in itself, rather than a branch of

general surgery. Plastic surgery and the surgery of diseases peculiar to women had each their own special adepts, and conservative surgery had its limits widely extended. At this time, also, many operations that had previously fallen into disuse were revived, were frequently practised, and took an established place in surgery. Lithotrity came to be practised in the hospitals, and was slowly substituted there for lithotomy. That great triumph of the surgeon's art, ovariectomy, was frequently practised and greatly improved; and various other operations received a new and vigorous impulse. The whole of the art of surgery in its manipulative department was carried by the combined efforts of a number of active and zealous practitioners to a point of perfection far beyond any that it had heretofore attained, and very far in advance of what it had occupied but a very few years previously.

The gain resulting from this advance in our art can never be lost, and has been definitively secured to surgery and to mankind. There is no retrogression in surgery. Every conquest that has been made has been permanent. The march has ever been onward, and year after year some new position has been occupied—often, it is true, after a hot conflict of opinion. But once gained it has never been lost, and thus our standpoint has ever been pushed further in advance. For skill in art is a tradition which is hereditarily transmitted, if not by the individual, yet by the profession to which he belongs, from which he has acquired and to which he bequeaths it.

What our predecessors have done we well know and can readily accomplish. In what we can do our successors will not fail.

That there must be a final limit to development in this

department of our profession there can be no doubt. The art of surgery is but the application of manipulative methods to the relief and cure of injury and disease. Like every other art, be it manipulative, plastic, or imitative, it can only be carried to a certain definite point of excellence. An art may be modified—it may be varied—but it cannot be perfected beyond certain attainable limits. And so it is, and indeed must be, with surgery. There cannot always be fresh fields for conquest by the knife. There must be portions of the human frame that will ever remain sacred from its intrusion—at least, in the surgeon's hand.

That we have nearly, if not quite, reached these final limits there can be little question. When we reflect that every large artery in the human body up to the aorta itself has been repeatedly ligatured—that each of the six large articulations and many of the smaller bones have been resected—that the amputation of each limb up to the shoulder and hip-joints is a matter of ordinary surgical occurrence—that large tumours having the most intricate anatomical connexions have been removed from every surgical region in the body, from the base of the brain to the lowest organ in the pelvic cavity—when we reflect, I say, on triumphs of the surgeon's art that are expressed by operations such as these, we can scarcely believe that much remains for the daring of the boldest to devise, or the skill of the most dexterous to accomplish, in the extension of that art in the direction of the operative department of our profession, and that the surgeon must in future be content to repeat, though possibly in a modified and improved manner, those operations that have been inaugurated by the genius and perfected by the skill of his predecessors.

It is true that there are yet regions that have rarely been successfully invaded by the scalpel, though they have been contemplated as possible seats of future surgical operations. But it has yet to be determined whether the extirpation of the kidney and of the spleen is more than a bold experiment on the power of endurance of the human frame; whether it is a surgical triumph or an operative audacity.

I believe, then, that we have at length reached something like finality in the mere manipulative art of surgery; though I hesitate much to use that word "finality," for I know well how apt a man is to suppose that art to the prosecution of which he has devoted his life to have attained its final limit of perfectness. Yet, looking at the question as dispassionately as I possibly can, I cannot but come to the conclusion that we can scarcely hope to pass far beyond the line at which we have arrived in the direction of extreme precision and almost absolute certainty in the mechanical performance of the operations of surgery, and that in this direction the progress of modern surgery is nearly barred. At the same time we may reasonably expect that the methods of practising operations may from time to time be materially modified and improved by the skill of individual operators, by the ingenuity of surgical mechanics, or possibly by the introduction of new agents, such as electricity, as aids to our art.

But if operative surgery has attained its most brilliant results;—if the knife has been carried triumphantly, and with the most successful issues, into almost every part of the human frame; if the surgeons of this generation have gone as far beyond their predecessors in boldness of conception as they have excelled them in precision and certainty

of execution, so that we may look upon modern surgery as having attained in its operative department as high a degree of perfection as the most consummate anatomical knowledge and the extreme development of manual skill can carry it,—yet there is another direction that practical surgery has taken which is apparently so opposed to that which I have just been describing, that it is not easy at first to understand how it could have progressed simultaneously and coterminously on both lines.

For strange and, at first sight, paradoxical as it may appear, whilst surgery was making rapid strides in its purely operative department, there has been *pari passu* a corresponding tendency to limit the number and to lessen the severity of those very operations, and to substitute for the knife manipulations of a gentler character, by which the same effects were sought to be produced. For it has now come to be considered as a truism that mere mechanical dexterity does not constitute true surgical skill, and that the perfection of surgery consists in producing the desired result by the smallest expenditure of force. Expenditure of force by the surgeon entails a corresponding exhaustion of power on the part of the patient. This signifies loss of vitality, and consequent diminution of reparative action.

I might adduce numberless illustrations of this marked tendency in modern surgery to lay aside the knife and to substitute for it other and milder methods of treatment. We see this every day in the minor departments of surgery—in the treatment of carbuncle, for instance, without indelibly marking the patient with the sign of the cross, in the use of the aspirator instead of the knife, emptying by a simple puncture not only abscesses and cysts, but

distended bladders and incarcerated herniæ; in the frequent successful application of electricity and elastic tension in the treatment of deformities as substitutes for indiscriminate tenotomy; in the use of escharotics instead of the knife and the gouge in the treatment of chronic caries of bones; in the whole of the so-called "conservative surgery," which seeks the preservation of the limb by the sacrifice of the diseased part only, just as by a ruder surgery the preservation of the body was sought to be effected by the amputation of the partially spoiled limb.

But the two most conspicuous illustrations that I can give of this remarkable tendency in modern surgery to lay asidet he knife wherever and whenever practicable, and to obtain the greatest possible result at the least expenditure of force, is in the treatment of those two diseases—aneurism and stone—which, more than any others, have occupied the thoughts and absorbed the attention of the most distinguished members of our profession.

There is no episode in surgery more interesting in itself or more clearly illustrative of the truth of the proposition that I now advance, and more typical of the direction taken by modern surgery, than the history of the progressive changes that have of late years taken place in the treatment of aneurism. The surgeon has discarded the knife for the compressor; that instrument for the simple pressure of the finger or flexion of the limb; and, finally, it has been shown that the slower consolidation by decolorized fibrine is not necessary, but that the rapid deposition of dark clot is amply sufficient for the cure of the disease in its worst forms.

In looking to the future, so far as the treatment of

aneurism is concerned, I cannot but think that there is yet an agent destined to play a great part; and that electro-puncture, or the process by electrolysis, deserves the fullest attention on the part of the practical surgeon. The experiments and researches of Dr. John Duncan and of Cineselli establish the undoubted fact that in electricity we possess an active agent for the cure of aneurism, which may succeed in many cases beyond the reach of knife, compressor, or finger; and that may in others be advantageously used in conjunction with these means.

Another conspicuous illustration of the tendency in modern operative surgery to substitute milder for the more heroic methods of treatment is in the general adoption of lithotripsy in all practicable cases instead of lithotomy. But even in this direction the tendency is still further to attempt the reduction of the frequency of the necessity for operating in cases of stone by endeavouring to prevent the formation of calculi, or, if once formed, to aid in their solution. For, we may echo the hope expressed by Simpson when he says, "Surely the time is not far distant when a higher chemistry will thus enable us to remove some calculi without the horrid necessity of the knife or lithotrite."

Thus, then, it would appear as if the practical school of surgery had nearly reached its final limit of development so far as the mere manual mechanism of the art is concerned, and that, after having attained to something like finality in this direction, the stream of surgical thought is turning aside into a new channel, the directions of which will tend to limit the unvarying use of the knife, to render its employment more restricted and exceptional, and to substitute for it other means for the accomplishment of

those ends that formerly could only be attained through its instrumentality.

But if modern operative surgery has attained to so high a pitch of perfection in all that relates to boldness of conception and to precision of execution, so that we can scarcely hope to see any further progress in these directions; and, indeed, if the most advanced modern surgery is seeking to lay aside the scalpel and the bistoury for milder methods of treatment—if, in fact, the practical school of surgery has, so far as our present means and our present knowledge are concerned, reached, or nearly so, its final development, the case is widely different with the other great school of surgery—the *scientific*.

For here, truly, so far from having approached the final limits of our subject, we are but as yet halting on the threshold. And whether we regard the science of surgery in its relation to the essential nature, the character, and the pathology of surgical diseases and injuries, or whether we consider it in reference to all those circumstances which, independently of the mechanical skill of the operator, influence for good or for ill the results of his procedures, we have a field before us as vast as it has hitherto been little cultivated.

We have seen how the practical school of surgery has been developed of late years, and to what a point of perfection it has attained; now let us briefly examine the position and the immediate future of the scientific school.

The *Hunterian* or *scientific* school of surgery, though less numerously represented than the practical, has been illustrated since the days of its great founder—John Hunter—by names that are amongst the most brilliant in the

annals of British surgery. The Bells and Abernethy, Travers and Brodie, exercised by their writings and their teachings on surgical pathology a most potent influence on the surgical mind of this country, and laid the foundation of the British school of scientific surgery; and it is around this nucleus of surgical pathology that scientific surgery has gradually developed. But still this school could scarcely be considered as existing in a concrete and definite form until surgical pathology was consolidated into a system in those admirable lectures which though delivered nearly a quarter of a century ago at the Royal College of Surgeons by Sir James Paget have never been surpassed for depth of philosophic research and comprehensiveness of scientific thought.

Since that period surgical pathology has been regarded as a distinct department of medical science, and has advanced with a rapidity that has fully kept pace with pathological science in its more medical aspect. And if I do not dwell upon these advances in a more special manner, it is because their consideration would lead me too far afield into the general domain of pathology, and too widely apart from that of surgery properly speaking.

It is easy to speak of, but indeed it is not easy to say in what the "science of surgery" actually consists. We are, I think, too apt to speak of it as a distinct entity, as a separate branch of the natural sciences; to regard it as existing in a defined and concrete shape, like the science of astronomy or of chemistry; as being something more definite than what in reality it is—merely a branch of general, biological, and pathological science—that portion of it which is specially connected with the *rationale* of surgical

processes and operations. In many cases it consists, perhaps, rather in the application of knowledge, derived from the cultivation of other and collateral departments of science, to purely surgical ends.

We see this conspicuously illustrated in some of the more recent advances of surgical science and in its application to practice.

It is by this application that the science of surgery has made such great progress of late years, and it is in this direction that we may probably look for its most brilliant achievements in the future. Every department of physical and natural science may thus be, and has been, laid under contribution by the scientific surgeon to aid in the development of his own branch of knowledge.

It is needless to speak of the immense assistance that physiology and pathology have afforded to surgical science.

By calling in the aid of physical science, we find that electricity is beginning to play a part destined, doubtless, before long to be a great and most important one in the diagnosis and treatment of various surgical ailments. The use of electricity in the diagnosis of the true nature and special cause of various kinds of deformity of the limbs and their treatment, by Duchesne, is one of the happiest applications of physical science to a surgical end. The application of the same agent to the cure of aneurism and *nævus* by electrolysis of the contained blood, or to the ablation of vascular parts without risk of hæmorrhage, by that instrument as beautiful as it is ingenious—the galvanic *écraseur*—are all instances of this application of a physical science to a purely surgical end.

It might be supposed that ordinary descriptive anatomy (if I can venture to dignify it as a science) had been so

minutely studied that there were few, if any, applications of it to surgery that had escaped practitioners of our art. But where can we find a more happy example of the application of an apparently dry and uninteresting anatomical fact to scientific surgery than in the study of the anatomy of the ilio-femoral ligament by Bigelow, and the complete revolution that this study has effected in our knowledge of the mechanism of the dislocations of the hip-joint and in their methods of reduction? A somewhat analogous application of a seemingly barren anatomical fact in surgery is to be found in Amussat's great operation of colotomy being dependent on the anatomical relations of the descending colon to so obscure a structure as the mesocolon in the left lumbar region.

But exact science even may be brought to bear on the progress of surgery, and perhaps ophthalmology supplies the most copious and the most precise illustration of the combined application of physical and exact science to the elucidation of surgical phenomena. Donders truly says that "in the doctrine of the anomalies of refraction and accommodation the connexion between science and practice is more closely drawn together than in any other part of medicine." At this point, in fact, and at this only, does surgery become an exact science. But here it is as exact as any other department of optics, and not only are its precepts based on exact rules, but its diagnosis and treatment are founded on laws that are as accurately determined as they are fixed and unvarying.

The application of the results of the more advanced doctrines of natural science have equally tended to the realisation of some of the most important achievements of which modern surgical science can boast.

Without entering into the discussion of the vexed question of generation—for whether that may be spontaneous or must be by germs I leave to philosophers to decide,—I may say that the idea of what I believe to be one of the greatest triumphs of modern surgical science was furnished to Lister by the study of the doctrines of Pasteur on the production of disease in some of the lower tribes of animals by the development of organisms, which in their turn when deposited on congenial media were capable of producing changes of a fermentative and disorganising character; and we owe the method of treating wounds known as the “antiseptic treatment” to the direct and happy application of these doctrines to the practice of surgery.

There is probably, however, no collateral branch of knowledge that has a closer and more direct bearing upon the advance of surgical science than has *hygiene*; and if I do not greatly err, it is in this direction and in its application that we ought to look for some of the greatest improvements in modern scientific Surgery. Hygiene has a double relation to surgery: It may be considered—(1) in its application to the prevention of diseases and deformities that render surgical interference necessary; and (2) in its influence on the results of such interference or operation.

The influence of hygienic measures on the prevention of purely surgical diseases is well illustrated by the possibility of preventing the formation of certain forms of calculus, by the adoption of measures calculated to modify or to arrest those impairments of assimilation of which the ultimate formation of stone in the urinary organs is the last link in a lengthened chain of morbid actions.

That hygienic measures properly applied may even be influential in the prevention of congenital deformities and defects, there is every reason to hope. Take that most distressing congenital deformity, a cleft palate: what is apparently more hopeless so far as preventive hygiene is concerned? But yet, if we learn the lesson taught I believe by the Rev. Dr. Haughton from some of the lower animals, we may possibly by its application to the human female prevent the occurrence of that most distressing defect, and possibly other similar ones, as spina bifida, in her offspring. For this curious fact had been noted, that the lion cubs born in zoological gardens were uniformly affected with cleft palate. This was attributed to the nature of the food given, the lioness being fed with masses of meat attached to large and strong bones, which the animal was unable to crunch and devour. It was thus deprived of its due supply of phosphates. These were afforded to the lioness in the Dublin Gardens by giving her rabbits and other small animals, the bones of which she could readily masticate. The result has been that a litter of cubs has been born without the usual deformity, and with normally developed palates.

But it is by its influence on the results of operations rather than to their prevention that the application of hygiene to surgical science has been, and will be, attended by the most important consequences.

It is the study of those circumstances which, independently of the mere manipulative skill of the operator, influence the results of his operations, and often counterbalance all the good that the most advanced art, wielded by the most consummate skill, can effect.

And here I do not speak of the mere local results; so far as they are concerned, there is but little to be desired. The results of most plastic, conservative, and ophthalmic operations are as satisfactory as the most sanguine could hope for or the most critical expect. So also with respect to that multitude of minor operations that are practised for the relief of various distressing maladies, and which are followed by the happiest consequences. But when we come to consider the issues of those greater and graver operations by which the life of a patient is directly imperilled, we are constrained to admit that success in results has lagged far behind and borne no relation to perfection in the execution of the operation, and that in this respect the highly polished art of modern surgery far outshines its science. But success in the results is, after all, the thing to aim at, and no amount of manual dexterity can compensate for its want. Dexterity is only one element of success, and however important it is to be dexterous operators, it is better still to successful ones.

We have, as has already been seen, carried the art of surgery to the highest degree of perfection of which, as an art, it is susceptible. But although we have undoubtedly immensely improved on the rapidity, the precision, and the simplicity of our operations, we are constrained to admit that we have not succeeded in rendering them proportionately less fatal. And here the surgeon has a wide field open before him in the future; and I can truly say there is no direction in which it can be cultivated that promises a more fruitful harvest than in endeavouring to make the success of the result balance the skill in the performance of an operation.

For it is useless—worse than useless, it would be criminal—to deny or ignore the fact that the mortality resulting from or consequent upon the greater operations has not only not diminished of late years, but has, there is reason to believe, in some cases actually increased. The present death-rate after lithotomy—even when making allowance for the application of lithotrity to the more favourable cases—is quite as great as it was in the days of Cheselden or of the great Norwich surgeons. Herniotomy is at least as fatal as it was in the hands of Hey and of Cooper; and the result of the ligature of the larger arteries has actually in some cases—as in the common iliac—become more unfavourable of late years.

Whatever explanation we give of it, the fact remains certain, that the present rate of mortality after amputation of all limbs in the largest metropolitan hospitals of Great Britain is at least one in three; in those of Paris (Malgaigne and Trélat) nearly one in two; in Germany as nearly as possible the same—*i.e.*, nearly one in two. In military practice the recent experience deduced from the results of operations on the wounded in the great wars of modern times on both sides of the Atlantic is equally unfavourable. But to these I shall not do more than allude, as the disturbing and destructive influences at work during the progress of active war are so peculiar and so great that they remove these cases into a category of their own, entirely apart from amputations in civil practice.

But this fact is certain, and it is as melancholy as it is true and incontestable, that, taking the average mortality after amputations of all four limbs in the largest hospitals, in the hands of men of the most consummate skill in the

great centres of civilization, we come to this result, that the mortality calculated on large numbers varies from 35 to 50 per cent., but is steady and unvarying between these figures. This is a result that is but little creditable to surgery; and in some amputations, as of the thigh and at the hip-joint for injury, the mortality rises to the frightful and astounding height of from 60 to 90 per cent. In fact, so constantly do these numbers come out in hospital and army returns, that surgeons have almost come to regard them as representing the necessary or (so to speak) the normal rate of mortality after amputations.

But is this really so? Must hospital surgeons ever remain content in losing from one-third to one-half of *all* their amputation cases, and nine-tenths of some? Is this frightful death-rate the necessary result of the operation, and thus beyond the control of our science and the skill with which the art is exercised: or is it dependent on causes that are preventable, and which may be counteracted or removed? Surely here is ample scope for science to aid the operations of our art, and to supplement it where it ceases to be any longer efficient.

That this may be done Sir James Simpson has abundantly proved. Without going into details, which would here be alike unnecessary and tedious, it may be stated broadly that having collected a large and nearly equal mass of statistical returns of consecutive operations performed in large and in small hospitals, in country, mining, and private practice, he found that of 2089 cases of amputations in large hospitals in this country, 855, or 1 in 2.4, had died; whilst of 2098 in country and private practice the deaths were only 226, or at the rate of 1 in 9.2.

It is quite possible that Simpson's figures may not be absolutely but only approximately correct, and that certain sources of fallacy have introduced themselves into his tables. But making all reasonable allowance for every possible source of error, the difference is so great between the operation of amputation in and out of hospital that the material result cannot be affected—viz., that a mortality of 1 in 2·4, or in other words of more than 40 per cent., is not a necessary result of amputations; that it is greatly the result of the circumstances in which the patient is placed after the operation; and that it may be materially reduced, according to Simpson, by nearly three-fourths, so as to amount to less than 12 per cent., by an alteration of these circumstances; and that the mortality so dependent on circumstances which admit of alteration, of modification, and probably of rectification, is certainly equal to that which exceeds 1 in 9, or 12 per cent.

But when we come to analyse these results more closely, some startling facts are elicited. Thus, amputation through the forearm cannot surgically be considered a very serious operation. It is not likely to prove fatal by any conditions dependent on or inherent in it—as, for instance, by shock or hæmorrhage,—but can only become fatal by the intrusion of other and adventitious circumstances dependent on causes existing outside the operation itself. Well, what is the result? That of 377 cases occurring in private and country practice only 2 died, whilst of 244 in hospitals no less than 40 died, being 1 in 188 against 1 in 6.

Surely here is a condition of things most unsatisfactory in itself, and not very creditable to modern surgery, and

one in which we may hope that the further cultivation of the science may do much to aid the progress of the art of surgery.

But it would be an error to suppose that it is only in amputations that "hospitalism" exercises its injurious influences and leads to such disastrous results. It is doubtless more or less so with all operations by which extensive wounds are inflicted, and in none more so than in that which we may consider with justice and with pride as one of the greatest glories of the modern school of British surgery—I mean ovariectomy.

Nothing is more interesting and instructive than the early history of ovariectomy. It owes its origin and its establishment in practice entirely to the success that attended its performance in the hands of country and private practitioners. Almost all, if not all, the early successful cases were done on private, and not on hospital patients. It was tried in the London hospitals, but so great was the mortality following the operation when there performed that there was the greatest danger of its falling entirely into disrepute and neglect. The operation was denounced as unjustifiable, and the operators were stigmatised in opprobrious terms by two of the most eminent, and ranked amongst the boldest, of the operating surgeons of that day—Lawrence and Liston. It has never taken its place as an operation practicable like others in large metropolitan hospitals. It has been proved by a sad and disastrous experience that if ovariectomy be practiced in a large hospital, and if the patient be placed in a general ward—or even if she be secluded in a private one, but if she is exposed to hospital influences,—her chance of re-

covery is rendered so small that no prudent surgeon will now undertake the operation in such circumstances. For the mortality after ovariectomy in hospitals amounts to 76 per cent., whilst in private practice Spencer Wells at most has lost only 24 per cent., or less than one-third of the hospital rate of mortality. And this amount of loss is, with increasing aptitude and experience, actually still on the decline; and Keith, of Edinburgh, has achieved the marvellously successful return of 27 deaths in 144 cases, or a mortality of only and about 18 per cent.

That which holds good with amputations and ovariectomy must surely be equally applicable to other great operations, and would doubtless be found to be so if their comparative statistics were worked out; and if the rate of mortality after amputations is nearly four times, and that after ovariectomy more than three times, as great in large general hospitals as it is in small institutions and in private practice, a more or less correspondingly high rate of mortality may be supposed to attach itself to other of the great operations by which life is directly imperilled.

Here, then, is a vast and most fertile field to which you who are commencing your studies may direct your attention with the greatest advantage, and which you who after this session will go forth into the world to practice, may cultivate with a double advantage to humanity and to yourselves.

In conclusion, then, gentlemen, although I believe that we have nearly reached to something like final perfection in the mere art of manipulative surgery, let me beg of you to do your best to acquire dexterity and precision in its operations, and not to undervalue their importance. These

qualities are easily attainable in early professional life; they can never be acquired later. It is the simple physical education of the eye and the hand that is required: like all physical exercises, it is of ready attainment in youth.

But let me urge upon you most earnestly not to neglect the study of those sciences which I have shown you sublie even so practical a subject as surgery, and which are probably of greater importance still in their connexion with other departments of the profession. But unless you intend to become philosophers, do not study those sciences: interesting and, indeed, captivating as most of them are, for their own sakes, use them only so far as they are subservient to the great object of the studies of at least ninety-nine out of every hundred of you,—that of preparing you to become practitioners. And bear this in mind, that the foremost men in our profession have ever been, and still are, those who are the greatest practitioners of its art, and that there is no calling more interesting in its practice, and more independent and useful in its exercise, than that of medicine in its largest and highest sense.